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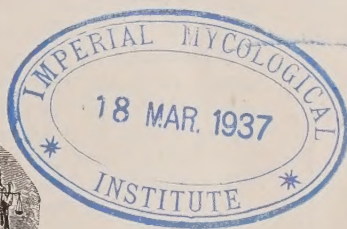
# New York State Agricultural Experiment Station

Geneva, N. Y.

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## THE UNCERTAIN HYPHOLOMA

F. C. STEWART



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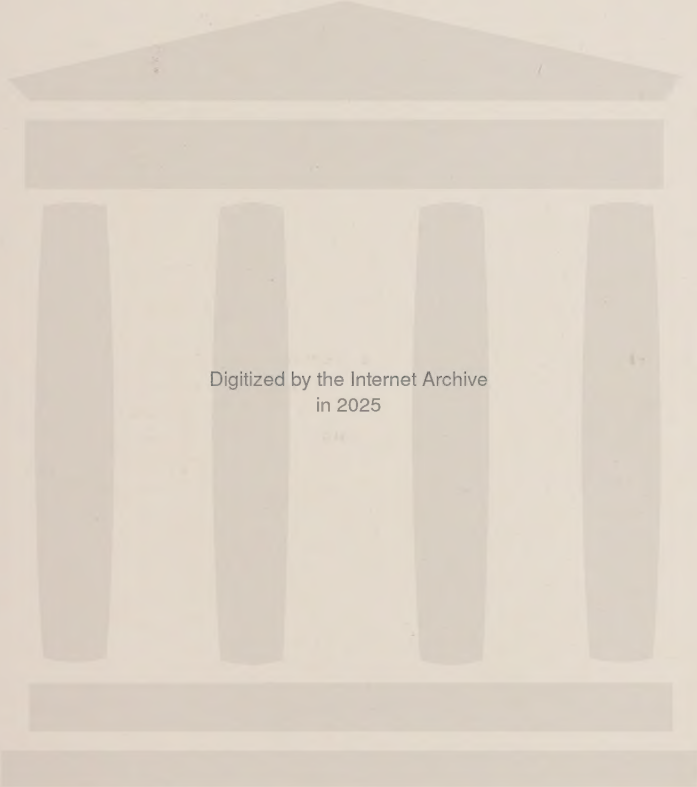
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## ABSTRACT

THE uncertain *Hypholoma* (*Hypholoma incertum*) is a small mushroom which frequently grows in abundance about stumps in lawns from early June to late September. It deserves to be better known. Once it is recognized and carefully studied there should be little danger of confusing it with any poisonous species. A full description of it is given and an instance cited in which it was confused with *Inocybe lanatodisca*, a species of doubtful edibility.

At Geneva, N. Y., a stump may bear from one to nine successive crops of the fungus per season and continue to bear for several seasons. About the slowly dying stump of a hickory tree it appeared each summer for 14 years. An account is given of an unsuccessful attempt to transplant the fungus from beside a maple stump to the former site of a willow bush.

The preferred method of cooking is the same as that recommended for the mica ink-cap, *viz.*, boiling to dryness in 20 minutes or more, followed by frying in butter for 15 or 20 minutes, and seasoning with salt and pepper. The uncertain *Hypholoma* may be cooked with the mica ink-cap.



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THE UNCERTAIN HYPHOLOMA, *Hypopholoma incertum*.  
(From a painting by J. S. Lawson.)

## THE UNCERTAIN HYPHOLOMA

F. C. STEWART

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### INTRODUCTION

Persons of esthetic taste are often distressed by the unsightliness of fleshy fungi growing about stumps in their lawns. To others, more practical minded, the palatable food which the fungi supply amply compensates for their ugliness. Since no satisfactory method of preventing the growth of such fungi is known, the wise thing to do, when the fungi are of edible kinds, is to make the best of the situation by gathering and cooking them.

The worst offenders, in this respect, are the mica ink-cap (*Coprinus micaceus*) and the large ink-cap (*C. atramentarius*). Both are of common occurrence and often abundant. When young they are edible and of excellent quality. When old they are black and disgustingly unsightly.

Among several other kinds of mushrooms which grow about stumps in lawns but which are less striking in their appearance is the uncertain *Hypholoma* (*Hypholoma incertum*). It is a comparatively small mushroom with a thin, white or cream-colored cap and purple-brown gills. Because it is edible, abundant, and readily accessible, it is one of the dozen mushrooms which every New Yorker should know.

### THE NAME

Outside of mycological circles the fungus is not sufficiently well known to have acquired a widely used common name. The name "uncertain *Hypholoma*" comes from the botanical name *Hypholoma incertum* given to it by the eminent mycologist, Dr. Charles H. Peck, who was State Botanist of New York from 1867 to 1913. He first described it in 1878 under the name *Agaricus (Hypholoma) incertus*. In 1899 he re-described it and changed the name to *Hypholoma incertum* in conformity with the nomenclatorial usage of the time. The specific name "*incertum*" was given to it by Dr. Peck because of its resemblance to two previously named species by *Hypholoma* (*H. Candolleianum* and *H. appendiculatum*) and the uncertainty of its relationship to them.



Probably the lay reader will be surprised to learn that this uncertainty has not yet been entirely cleared up. After 40 years or more of study and discussion mycologists still disagree as to the proper botanical name of the fungus. Surely, "uncertain *Hypholoma*" is an appropriate common name! Whatever may be the botanical name ultimately agreed upon, "uncertain *Hypholoma*" should be retained as the common name.

## DESCRIPTION

It is dangerous to eat any wild mushroom which one does not know. None of the so-called edibility tests are reliable. Hence, the first concern of the mycophagist should be to know the fungi which he eats. But the layman who endeavors to learn the name of a mushroom from printed descriptions is at a disadvantage. He is unfamiliar with many of the technical terms which, for the sake of accuracy and brevity, are used in technical descriptions of mushrooms. Also, rarely does he have a compound microscope for the examination of the microscopic structure which sometimes is of great importance in the identification. It follows that, for the lay reader, the usual technical description should be supplemented by a popular account. Photographs and color plates, also, are helpful in identifying mushrooms.

## TECHNICAL DESCRIPTION

Technical descriptions of *Hypholoma incertum* prepared by Dr. Peck are to be found in four separate publications of the New York State Museum at Albany (3, 4, 5, 6).<sup>1</sup> In the second and third of these the description is accompanied by a color plate. All of the descriptions are good; but, unfortunately, all four publications are out of print.

Probably the most complete and accurate technical description of the fungus published up to the present time is to be found in Kauffman's (2, page 263) book on *The Agaricaceae of Michigan*. This, also, is out of print, but a verbatim copy of the description follows:

"Pileus 3-7 cm broad, fragile, at first oval, obtuse, then broadly campanulate to expanded, at length split radially, hygrophanous, pale honey-yellowish, then buff to white as moisture disappears, white flocculent or at length glabrous, even or slightly wrinkled when dry, the margin at first hung with loose shreds of the veil, in age often violaceous, lilac towards margin. Flesh thin, white. Gills adnate-seceding, narrow, almost linear, thin, close, at first white, then pale dingy lilac or rosy-brown, finally purplish or darker, edge minutely white-fim-

<sup>1</sup>Numbers in parentheses refer to Literature Cited, page 16.

briate. Stem 3–8 cm long, 3–6 mm thick, rather slender, equal, hollow, subrigid, easily splitting lengthwise, even, white, innately silky, floccose or mealy above. Spores 7–8 x 4 micr., elliptic-oblong, obtuse, smooth, purple-brown in mass. Cystidia none on sides of gills. Sterile cells sac-shaped, i.e. inflated above, obtuse, 30–40 x 12–15 micr. Basidia 32 x 9 micr., short-clavate. Odor and taste agreeable.

“Densely gregarious or subcaespitose, sometimes scattered, among grass on lawns, roadsides, fields or rarely in woods among sticks and debris, nearly always around old stumps or buried stumps, roots or decayed wood; sometimes in greenhouses.”

#### SUPPLEMENTARY POPULAR DESCRIPTION

The uncertain *Hypholoma* is a comparatively small mushroom. Usually its cap is between 1 and 2½ inches in diameter and its flesh very thin. Consequently, a very large number of caps is required for a meal. It would have small value as an edible fungus were it not for the fact that it occurs in enormous numbers.

The caps, when young, are bell-shaped. They soon become umbrella-shaped and, finally, plane. Sometimes the margin is slightly upturned. Often at maturity, particularly when exposed to the sun and drying winds, the caps split from the margin halfway or more to the center (Figs. 1, 2, and 3). They are so fragile that it is difficult to gather them without breaking them. The caps are said to be “hygrophanous” because they change color upon drying. When young and fresh they have a moist or water-soaked appearance well described as “pale honey yellowish”. This condition is seen at its best in damp, cloudy weather. As the caps expand and the moisture in them escapes, the color changes, usually to white with a yellow tinge at the center, or to buff with darker center. (See frontispiece.) The color change begins at the center of the cap and progresses rapidly toward the margin. Violet and lilac tints also are often seen.

The surface of the cap is sometimes slightly wrinkled (Fig. 2) and, in dry weather, often conspicuously scarred with irregular cracks (frontispiece and Figs. 1, 2, and 3); but it bears no scales or hairs. The margin of the cap is frequently lobed, wavy, or irregular and, in young plants, provided with a delicate white fringe composed of loosely-attached fragments of the ruptured veil.

The so-called veil is a delicate membrane which hides the gills of very young plants. It breaks up so early and usually disappears so completely that frequently it is not noticed except in the form of soft white fragments adhering loosely to the surface and margin of the cap; and even in this form it is often difficult to detect. However, occasionally,





FIG. 1.—PLANTS OF THE UNCERTAIN *HYPHOLOMA*, NATURAL SIZE.



it is quite strongly developed and leaves the suggestion of a ring on the stem. In the small young plant shown at the bottom of the color plate, the veil has begun to break around the stem but still covers most of the gills. In the two large plants at the left side of the group shown in the color plate, the margin of the cap is fringed with delicate white fragments of the veil as they are seen under favorable weather conditions.



FIG. 2.—A CLUSTER OF SUBCAESPITOSE PLANTS OF THE UNCERTAIN *HYPHOLOMA*.

The fine wrinkling of the surface of the caps shown by these plants is frequently seen. Natural size.

The gills are at first white or whitish, then pale dingy lilac, and finally purplish or purple-brown. The term “adnate-seceding”, used in the technical description of the gills, means that they are at first attached to the stem by their full width but later separate from it.

The edges of the gills are said to be “minutely white-fimbriate” which means that they are lined with minute white protuberances.

Often these can be detected with the unaided eye. They can be readily seen with a  $10\times$  or  $14\times$  pocket magnifier, but higher magnification is required to bring out the structure of the protuberances. When a bit of the gill edge is placed under a good compound microscope, it will be seen that the white protuberances are groups of relatively large, sac-shaped, thin-walled, and almost colorless cells.

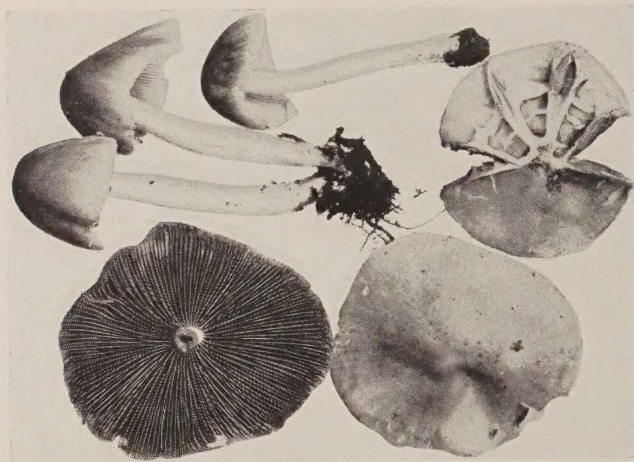


FIG. 3.—A COMPARISON OF IMMATURE WITH MATURE PLANTS OF THE UNCERTAIN *HYPHOLOMA*.

The three immature plants have bell-shaped caps with whitish gills; the three caps of mature plants are nearly plane and have purple-brown gills. One of the mature caps shows splitting and scarring due to dry weather. Natural size.

The stem is  $1\frac{1}{2}$  to  $3\frac{1}{4}$  inches long and  $\frac{1}{8}$  to  $\frac{1}{4}$  inch in diameter. In any given plant the diameter of the stem is the same thruout its entire length. There is no bulb at the base of the stem and it bears no ring. It is white and hollow. In breaking it has a tendency to split lengthwise. It has a fine silky appearance and the upper portion is covered with minute white particles giving it the appearance of being dusted with flour.

The spores are too small to be seen individually except when highly magnified. In mass, as seen in a spore print, they are purple-brown.

Neither the odor nor the taste of the plants in the raw state is in any way distinctive.

## HABIT AND HABITAT

When applied to mushrooms, the term "habit" refers to their manner of growth and the term "habitat" to their natural place of growth. The uncertain *Hypholoma* grows in colonies on the ground about



FIG. 4.—A COLONY OF SCATTERED PLANTS OF THE UNCERTAIN *HYPHOLOMA* GROWING ABOUT THE FORMER SITE OF AN APPLE TREE STUMP.

stumps or over buried wood. A colony of the fungus may contain only a few plants or it may contain hundreds of them. When the plants grow so closely together as nearly to cover the ground, their habit is described as "densely gregarious". This condition occurs frequently. It is illustrated by the group of plants shown in the color plate. When the plants grow in clusters with the bases of their stems close together but not actually grown together, they are said to be "caespitose" or "subcaespitose", according to the density of the clusters. The subcaespitose habit is common. It is illustrated by the cluster shown in Fig. 2; but when, less frequently, the plants grow well apart, as in the colony shown in Fig. 4, their habit is described as "scattered". Occasionally, they are found growing in a truly caespitose manner like the mica ink-cap.

The colonies of plants often appear at a distance of several feet from the stump with which they are connected. The writer has observed them growing in a lawn 25 feet from the trunk of a dying hickory tree whose decaying roots undoubtedly supported them. When they occur in lawns, far from visible wood, investigation will reveal buried wood, usually the remains of a tree stump, nearby.

Sometimes the fungus grows abundantly on the ground around piles of firewood in damp, shady places. A noteworthy example of this once



came under the writer's observation. In April, 1925, a dozen poplar chunks 13 to 16 inches in diameter by 18 inches long were placed in a compact pile under some lilac bushes. During August, 1926, some small colonies of *Hypholoma incertum* appeared on one of the chunks and also on the ground close about the pile of chunks. What happened in 1927 is not known; but in July, 1928, thousands of plants of *H. incertum* sprang from the ground all around the chunk pile and some even grew upon the top of one of the chunks 18 inches above the ground. It appeared as if the chunk pile which stood at the center of this large colony must be, in some way, responsible for the growth of the mushrooms, yet the wood was all either on or above the surface of the soil and surrounded by only a small quantity of woody debris consisting of fragments of bark; while many of the mushrooms were 4 to 6 feet distant from the wood. That these distant plants obtained their nourishment thru mycelial strands connecting them with the chunks of wood appears improbable. It is more likely that they were nourished by some substance which had leached out of the wood into the surrounding soil.

While, thru its feeding threads (mycelium), the fungus usually has connection with wood, it is rare that the stems of the plants are seated directly on wood. Besides the instance above mentioned in which it grew on poplar chunks, the writer has observed it attached to a prostrate willow trunk 18 inches above the ground and to the base of the trunk of a living false acacia tree (*Robinia pseudacacia*). Also, in another case, where a colony of plants grew in damp soil containing much woody debris, some were attached by their stems to chips and small sticks.

Altho *Hypholoma incertum* is often associated with living trees, it probably feeds only upon roots which are dead. It has not been proved parasitic or in any way injurious to the trees about which it grows. It appears to thrive equally well upon the wood of several kinds of deciduous trees and shrubs, but it is never found in connection with any kind of coniferous wood.

The habitat of *Hypholoma incertum* is very similar to that of *Coprinus micaceus*, the mica ink-cap. The writer has sometimes observed these two species growing intermingled about stumps of elm and maple trees. Like the mica ink-cap the uncertain *Hypholoma* occurs frequently in lawns and shuns the woods. However, Kauffman (2, page 264) has described a variety which occurs in the woods in Michigan. It differs from the type "only in that the plants are mostly solitary and

long-stemmed, scattered here and there among decayed sticks or leaves : its spores are perhaps slightly longer and slightly variable in shape, but otherwise it is very similar." He calls it variety *sylvestris*. In New York the writer has found the woods variety only occasionally — once at Geneva and five times in four years at Seventh Lake in the Adirondack Mountains.

#### CONCERNING THE DANGER OF MISTAKEN IDENTITY

The statement by Farlow and Burt (1) that, "nothing poisonous is likely to be mistaken for it",<sup>2</sup> expresses well the opinion of mycologists generally concerning the danger of making errors in the identification of the uncertain *Hypholoma*. Most of the deadly poisonous fungi belong to the genus *Amanita*. An *Amanita* has white spores, white gills, and a collar on the stem. The base of the stem is bulbous and set in a shallow cup or sheath or, in some species, adorned with rings of scales. The uncertain *Hypholoma* has none of these characters. It would be stupid to confuse any species of *Amanita* with the uncertain *Hypholoma*.

Of course there are some other species of fleshy fungi which may cause illness, or even death, but which are not *Amanitas*. To explain in detail how each of them differs from the uncertain *Hypholoma* would make this article much too long. Moreover, it might confuse the reader. The safest way to avoid being poisoned is to give careful attention to the general rules laid down for the gathering of mushrooms designed for table use. Only those which are positively identified and known to be safe should be retained for cooking. All unknown and doubtful specimens should be either discarded or placed in a separate container. Known and unknown specimens should not be mixed with the expectation of sorting them before cooking. Thorough sorting should always be done in the field. A second inspection during the preparation for cooking should insure the exclusion of undesirable and unknown specimens.

While the above precautions should always be taken, the writer's experience indicates that the chance of accidentally including poisonous specimens when gathering the uncertain *Hypholoma* is small. During 20 years of collecting *Hypholoma incertum* for study and for food in the vicinity of Geneva, N. Y., he has never found any poisonous species growing in association with it. The mica ink-cap, *Coprinus micaceus*, an edible species, grows in similar places and sometimes mingled with the uncertain *Hypholoma*. Young plants of the mica ink-

<sup>2</sup>They use the name *Hypholoma appendiculatum* Bulliard.

cap, under certain conditions, considerably resemble young plants of the uncertain *Hypholoma* and might be mistaken for them.<sup>3</sup> Twice we have found a few specimens of *Lepiota lilacea* Bres.<sup>4</sup> growing in association with the uncertain *Hypholoma* in scattered colonies like that shown in Fig. 4. It is smaller than *H. incertum*, has many small dark-colored spots on the cap, white gills, and a persistent, dark-colored ring on the stem. It should be readily detected because of these characters. Probably it is not poisonous, but it had better be discarded.

There are a few other species of *Hypholoma* which so closely resemble the uncertain *Hypholoma* that they often puzzle mycologists who have not made a special study of this genus. The mycophagist seeking the uncertain *Hypholoma* is liable to encounter specimens of some of these puzzling species, but this fact need give him no concern because none of them are poisonous.

An interesting case of mistaken identity came to the writer's attention in the summer of 1932. A young man who at that time knew several species of wild mushrooms, including the uncertain *Hypholoma*, and was in the habit of gathering them for table use, informed the writer that he had cooked, but not yet eaten, a mess of *Hypholoma incertum* which he had gathered under a certain hickory tree in a lawn on the Station grounds. The writer, knowing well the place where the mushrooms were found, and having never seen *Hypholoma incertum* growing there, became interested and visited the spot for the purpose of making some observations. He was startled when he discovered that the plants remaining belonged to a species of *Inocybe* and that there was no sign of *Hypholoma incertum* anywhere in the vicinity. Evidently, the mushroom gatherer had mistaken the *Inocybe* for *H. incertum*. Needless to say, the cooked mushrooms were thrown out and an investigation begun. It was found that the supposed *H. incertum* was, in reality, *Inocybe lanatodisca* Kauff., an uncommon species about whose edibility nothing is known.

*Inocybe lanatodisca* was named and first described by Kauffman (2, page 459) from plants collected in Michigan.<sup>5</sup> The general appearance of its young caps in size, shape, and color, is much the same as that of young caps of *Hypholoma incertum*, except that the center has a moldy-

<sup>3</sup>A detailed account of the mica ink-cap will be found in Bulletin No. 535 of this Station.

<sup>4</sup>Identified by the late Professor George F. Atkinson.

<sup>5</sup>In the original description the specific name, *lanatodisca*, is incorrectly spelled "*lanotodisca*".



white silky appearance which is lacking in *H. incertum* and the margin is not fringed with fragments of the veil as it is in *H. incertum*. The mature caps, also, are of about the same size and shape as those of *H. incertum* and in age they become deeply slit on the margin as in *H. incertum*; but the surface of the cap in *I. lanatodisca* is covered with silk-like fibrils and the color is ochraceous-brown or pale tawny. The gills of young plants of *I. lanatodisca* are white as in young *H. incertum*, but the gills of mature plants are ash-gray to pale tan, while in *H. incertum* they are purple-brown. The stem of *I. lanatodisca* is solid, while in *H. incertum* it is always hollow.

Several times previously during the same summer this collector had gathered *Hypholoma incertum* in quantity and, so far as known, made no mistake. His error in the present case must have been due to carelessness. The color of the caps and gills of mature plants should have warned him that he was not dealing with *H. incertum*; and had he felt the need of other evidence it was plain to be seen in the solid stems of the plants.

The experience described above need not deter anybody from eating the uncertain *Hypholoma* because, apparently, *Inocybe lanatodisca* occurs but rarely in New York and, besides, it may not be poisonous; but it emphasizes the necessity of constantly exercising caution when gathering wild mushrooms for food.

#### SEASON, NUMBER OF CROPS, AND PERSISTENCE

During the past 25 years the writer has recorded in his notes 139 gatherings of the uncertain *Hypholoma* made in the vicinity of Geneva, N. Y. Nine were made in May, 12 in September, and the remaining 118 during the months of June, July, and August. The earliest date on which the fungus has been found is May 21 (in 1918) and the latest date September 29 (in 1923). The principal season is between June 1 and September 1.

Wherever the fungus has once been found it may be expected to appear again in the same place. It may re-appear during the same season within a few days, a month later, or after a longer interval, depending chiefly upon the rainfall. Also, it is likely to re-appear in the same place during several successive seasons. In a recent paper, the writer (7) has reported observations which indicate that the number of crops produced by a particular stump in a single season may vary from one to nine and that the number of years a stump may continue to bear varies from 4 to 14.

The large crops appear immediately after rain periods of a few days duration whenever the total rainfall amounts to 1.5 inches or more.

### SPORE PRINTS AND SPORE FALL

In *Hypholoma incertum*, as in other species of *Hypholoma*, the color of the spores is purple-brown. This is readily determined by means of a spore print made in the following manner: Select a fresh plant with a fully expanded cap and cut off the stem close to the gills. Thrust a pin thru the center of the cap from beneath upwards.<sup>6</sup> Lay the cap, gills down, on a sheet of white paper on a glass plate or other smooth plane surface. Cover it with a tumbler or close-fitting dish to prevent rapid drying of the cap. From 2 to 3 hours later remove the cover and carefully lift the cap. A copious purple-brown spore deposit will be found on the paper. By moving the cap to fresh pieces of paper the operation may be repeated several times.

Experiments made by the writer indicate that spore fall is continuous for about 21 or 22 hours if the caps are set as soon as fully expanded and before the gills have begun to change color. The spores last to fall come from the ends of the gills, both at the stem and at the margin of the cap. By varying the length of the interval between the changes of paper, spore deposits of varying thickness may be obtained. In some of them the gills will be clearly and beautifully outlined.

### A TRANSPLANTING EXPERIMENT

The question is often asked, Can wild mushrooms be transferred from one location to another, either by sowing the spores or by transplanting the spawn? Theoretically, this should be possible by either method. In practice it is rarely accomplished by either method. In the case of *Hypholoma incertum* there are few, if any, records of carefully conducted experiments.

The writer once made an attempt to remove this fungus from the vicinity of a silver-leaf maple stump to the site of a large basket willow bush (*Salix purpurea*). Three years earlier the willow had been cut to the ground and its numerous stumps and shallow roots had been removed sufficiently to permit of making a lawn over the spot. Sprouts had been kept down by frequent mowing. Because of the large roots left in the ground with only a thin covering of soil, it was thought that *Hypholoma incertum* would find here conditions highly suitable for its growth.

On the morning of June 7, 1922, a troop of *Hypholoma incertum*

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<sup>6</sup>The pin is for use in moving the cap.

plants broke ground beside the maple stump. In the evening of the same day a sod 14 inches square by 4 inches thick and containing between 30 and 40 *H. incertum* plants was cut out and moved to a hole of the same size which had been prepared for it on the site of the willow bush. A small quantity of hen manure had been strewn over the bottom of the hole before the sod was inserted. The sod was carefully fitted into the hole, packed down, and 2 gallons of water poured over it.

The result was wholly negative. Altho there was an abundance of rain thruout the remainder of the season of 1922 and large crops of the fungus appeared about several other stumps in the vicinity, including the maple stump from which the inoculation sod was taken, no sign of *Hypholoma incertum* has ever been seen about the site of the willow bush.

Two possible reasons for the failure of the fungus to establish itself may be mentioned. It may have been unable to compete with the mica ink-cap, (*Coprinus micaceus*), the mycelium of which must have been already well established in the decaying willow roots. Large crops of the mica ink-cap covered the site of the willow bush on May 7 and 19, 1922. Also, it may have been suffocated by water. For about 4 days following a 5-inch rainfall during the night of August 23, 1922, the site of the willow bush was covered by water. The suspicion that this may have been a factor is supported by the fact that the mica ink-cap appeared to have been nearly exterminated by the inundation. The surrounding grass was injured only slightly.

### PREPARATION FOR THE TABLE

Because of the extreme fragility of the caps of *Hypholoma incertum*, it is difficult to gather them without breaking them badly. Also, since the fungus usually grows among grass many grass blades are often gathered with the caps and are a bit difficult to separate from them in the preparation for cooking. Both of these difficulties may be avoided to a large extent by using a pair of scissors for harvesting the caps. It is unnecessary to peel the caps and it does not matter if some portions of stems are included.

A good way to cleanse the caps and remove grass and other foreign material is to rinse them three times in the following manner: Place the caps in a pan of water, stir gently, then lift them with the hands and strain thru the fingers while passing them to a second pan of water, from which they are transferred, by the same process, to a third pan of water and, finally, to a frying pan.



The method of cooking recommended for the uncertain *Hypholoma* is the same as that recommended for the mica ink-cap. In fact, the two species may very well be cooked together. Having about the same consistency, they require about the same length of time for boiling and frying, and the flavor of the cooked product, tho different, is quite equal to that of either species cooked by itself. This is fortunate since the two species are often found at the same time and in similar situations.

The method of cooking preferred by the writer is the following: The cleansed caps are first boiled until the water in the frying pan is nearly, but not quite, all evaporated. The time required for boiling to dryness depends upon the quantity of water used and the rapidity of the boiling, but should not be less than 20 minutes. The water contained in the caps, together with that which adheres to them after washing, is usually sufficient for about 20 minutes of slow boiling. Hence, it is necessary to add only a small quantity of water.

As soon as the water has evaporated add butter and fry for 15 or 20 minutes. Season to taste with salt and pepper. If the mushrooms are not to be eaten until several hours after they are gathered, they had better be cooked at once and warmed over when needed. Warming over at any time within 12 hours after cooking frequently improves their flavor.

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